TREATING EXCESSIVELY SLOW RESPONDING OF A YOUNG MAN WITH ASPERGER SYNDROME USING DIFFERENTIAL REINFORCEMENT OF SHORT RESPONSE LATENCIES

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Fjellstedt and Sulzer-Azaroff (1973) used differential reinforcement of short latencies to decrease a child's latency to comply with instructions. We replicated this contingency with a young man diagnosed with Asperger syndrome across two tasks (question answering and math problem solving). We added a differential reinforcement contingency to teach the participant to discriminate between math problems that could be answered rapidly and those that required more time for accurate performance.

DESCRIPTORS: Asperger syndrome, differential reinforcement of short latencies, slow responding

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Some individuals diagnosed with Asperger syndrome or obsessive compulsive disorder take excessively long periods to complete routine tasks (e.g., 3 min to answer a question or 10 min to put on a sock; Ratnasuriya, Marks, Forshaw, & Hymas, 1991). Excessive slowness not only impedes completion of routine tasks but may also interfere with educational gains and social interaction (e.g., it is difficult to converse with someone who takes several minutes to answer simple questions).

Few behavior-analytic interventions have been developed to accelerate slow responding. For example, for a child who was slow to comply with instructions, Fjellstedt and Sulzer-Azaroff (1973) delivered tokens following task completion within a preset criterion (e.g., putting toys away in less than 3 min). This procedure resulted in decreased response latencies for five academic-related tasks. The applicability of this procedure to individuals with Asperger syndrome who display excessive slowness across activities remains untested. We replicated the procedures of Fjellstedt and Sulzer-Azaroff by applying a differential reinforcement contingency to the excessive slowness of a young man with Asperger syndrome. Further, we added a differential reinforcement contingency to teach a discrimination between tasks that should be completed rapidly and those that required more time for accurate performance.

STUDY 1

METHOD

Participant and Setting

Joe, a 19-year-old boy who had been diagnosed with Asperger syndrome, had been referred to a day-treatment center for the assessment and treatment of self-injurious head hitting and skin picking. Joe's educational placement was in jeopardy due to his problem behavior. During his initial intake interview, it was observed that he waited for long periods of time before answering questions (i.e., long latency to onset) and tended to speak slowly (i.e., long response duration). Joe's parents reported that he required excessive amounts of time to complete many tasks throughout his day

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(e.g., several minutes to sign his name to a check at a grocery store; difficulty conducting conversations) that limited his independence and led to others' impressions that he was of lower cognitive functioning. Sessions were conducted in small therapy rooms at the day-treatment center that contained a table, chairs, and typically a one-way observation window.

Response Measurement and Interobserver Agreement

During sessions, Joe sat across from and facing the therapist. Each trial was initiated by the therapist asking Joe a question. An observer used a stopwatch to measure the time from the end of each instruction to the completion of each task (i.e., the latency to task completion). To assess interobserver agreement, a second trained observer simultaneously but independently scored response latencies during 95% of trials. Observers' records were compared on a trial-by-trial basis and were scored in agreement if observers' records differed by no more than 1 s. Observers agreed on 93% of trials.

Procedure

During baseline sessions, the therapist asked Joe 1 of 25 questions pertaining to personal information (e.g., "What is your sister's name?") and then waited for Joe to respond. Question answering resulted in the presentation of the next question. Sessions ended after either (a) 10 trials were completed or (b) 10 min had expired, whichever came first. The latter criterion for ending a session was never met. Differential reinforcement of short latencies (DR-short) sessions were similar to baseline except that praise and one token (exchangeable for 30 s of video watching immediately following a session) were provided following any trial in which the latency to respond was below a preestablished criterion. (The DR-short contingency may also be considered a fixed-ratio 1 schedule with a limited hold.) The criterion for reinforcement decreased each session by 10% from the mean latency in the previous session (e.g., if the mean latency to respond during the previous session was 10 s, then the criterion for the following session was 9 s). The therapist stated the reinforcement criterion prior to each session (e.g., "Joe, you need to answer each question in less than 9 s to earn your token."). Any response that exceeded this criterion resulted in corrective feedback (e.g., "That was too slow, try to go faster next time."). The differential reinforcement of long latencies (DR-long) condition was conducted to reverse the effects of the DR-short contingency. Sessions during this phase were similar to the DR-short phase except that praise and tokens were provided following any trial in which the latency to respond was above 19 s, the mean latency to respond during baseline sessions. The effects of these contingency changes were demonstrated in a reversal design.

RESULTS AND DISCUSSION

Results of this assessment are depicted in Figure 1 as mean response latencies. During baseline, mean response latency was 19.9 s. Following implementation of the DR-short condition, response latencies decreased below 5 s by the third session of this phase. We then conducted a contingency reversal by implementing the DR-long condition, during which response latencies increased (M = 23.9 s). The DR-short condition was then reimplemented, with a replication of decreased response latencies (M = 3.0 s). These results are consistent with those of Fjellstedt and Sulzer-Azaroff (1973), in that the DR-short contingency was effective for decreasing the latency to Joe's question answering and extended these findings to a young man diagnosed with Asperger syndrome.

There were two limitations of the present study that we addressed in Study 2. First, we did not assess the extent to which the DR-short contingency resulted in generalized rapid responding. Second, we assessed the effects of the DR-short contingency with questions to which Joe immediately knew the answer. When presented with more challenging tasks, placing

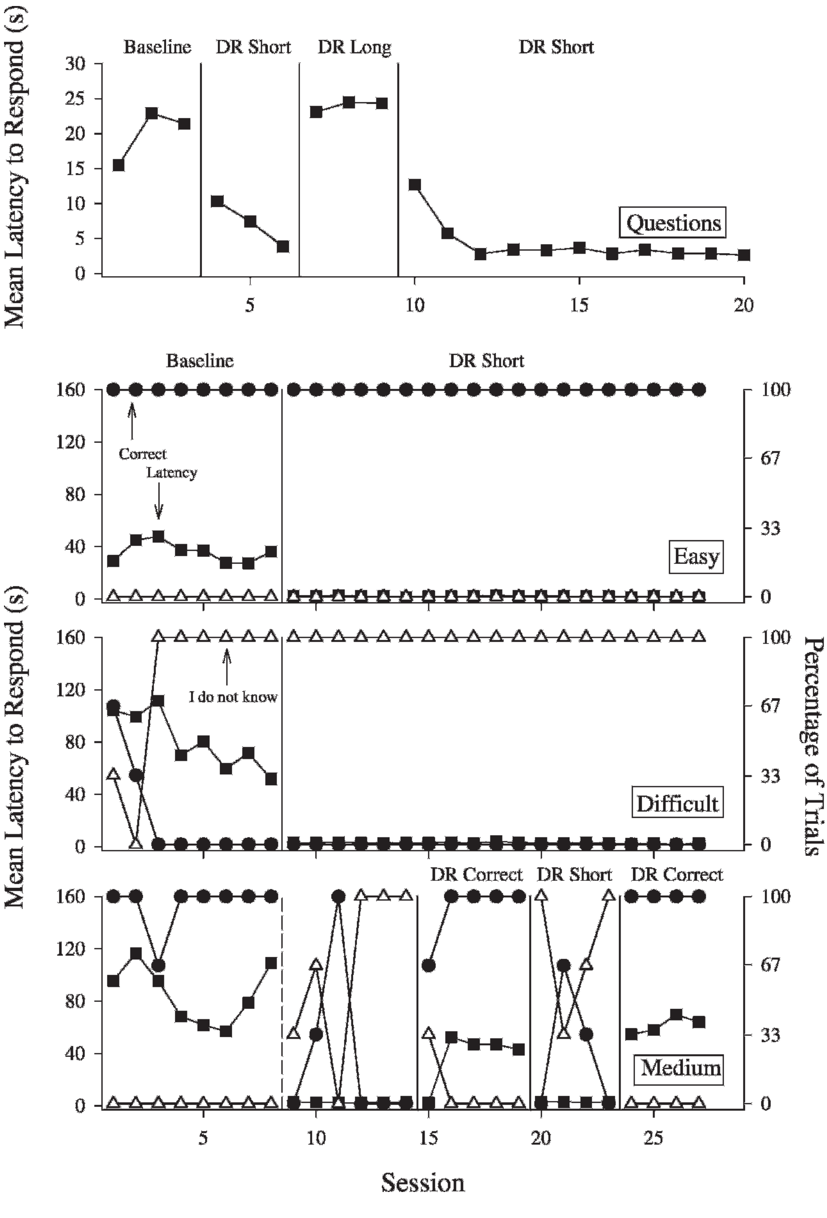

Figure 1. The top panel depicts Joe's mean latency to respond when asked questions pertaining to personal information (Study 1). The lower three panels depict Joe's mean latency to respond (corresponding to the left *y* axis) and the percentage of correct and "I do not know" responses (corresponding to the right *y* axis) to easy (second panel), difficult (third panel), and medium (fourth panel) math problems (Study 2). Contingency changes are noted by the solid phase lines.

a contingency solely on speed but not accuracy may promote rapid incorrect responses (e.g., saying "I do not know") rather than persistence in task completion. Therefore in Study 2, Joe was presented with novel tasks (math problems) that differed in their difficulty. This provided an opportunity to assess generalization both within and across math problem types.

STUDY 2

METHOD

Response Measurement and Interobserver Agreement

During sessions, Joe sat across from and facing the therapist. Each trial was initiated by the therapist instructing Joe to complete a math problem. Observers timed the latency from presentation of the math problem until Joe provided an answer. In addition, Joe's response on each trial was scored as correct, incorrect, or "I do not know" by circling a letter on a precoded data sheet. A second trained observer simultaneously but independently collected data during 58% of sessions. Observers' records were compared on a trial-by-trial basis. Response latency was scored in agreement if observers' records agreed within 1 s. Agreements regarding whether Joe responded correctly, incorrectly, or "I do not know" were scored when both observers circled the same letter. Mean agreement averaged 90% (range, 56% to 100%) for response latency and 99% (range, 89% to 100%) for response category (correct, incorrect, "I do not know").

Procedure

Sessions consisted of nine trials. During each trial the therapist presented Joe with one math problem (handwritten on a card) with four possible answers in a multiple-choice format. Three categories of math problems were presented. Easy problems consisted of single- and double-digit multiplication, single- and double-digit addition, and exponential powers. Parent report and preliminary probes showed that Joe on occasion would answer these problems rapidly (within seconds). Medium problems consisted of long-division problems. Preliminary probes showed that Joe was able to complete these problems correctly, but typically required time to work on the problems using a pencil and paper. Difficult problems consisted of geometry, trigonometry, and calculus problems. Both parent report and preliminary probes showed that Joe could not correctly answer these questions and would typically respond "I do not know" after some delay. Novel math problems were continuously generated such that Joe was never presented with the same math problem twice during the evaluation.

Three problems of each type (easy, medium, and difficult) were presented randomly during each session. Each trial began when the therapist presented a card with a math problem and said, "Joe, what is the answer to this problem?" During baseline sessions, correct responses resulted in brief praise and incorrect or "I do not know" responses resulted in reassuring statements (e.g., "That is okay, that was a hard question."). Sessions during the first DR-short condition were similar to baseline except that responses to easy or hard problems emitted in less than 5 s resulted in brief praise and a token exchangeable for video watching. Contingencies for medium questions remained identical to baseline. Prior to sessions during the DR-short condition, the therapist stated the rule, "You can sometimes earn tokens by answering problems in less than 5 s." The absence of a DR-short contingency for medium questions allowed us to assess any undesirable generalization of rapid responding across problem types. Sessions during the differential reinforcement of correct responding (DR-correct) condition were similar to DR-short except that an explicit contingency for correct responding was arranged for medium questions. That is, when a medium problem was presented, brief praise and a token were provided contingent on a correct response, irrespective of the latency to completion. Prior to each session during this condition, the therapist vocally stated the following rule, "Joe, if you know the answer, answer right away. If you know that you do not know the answer, tell me you do not know right away. If you do not know the answer, but can answer it with more time, then write it out on the paper and then answer." A second DR-short condition was then arranged as a contingency reversal. The second DR-short condition was identical to the first except that responses that occurred within 5 s of medium problem presentation resulted in praise and a token as well.

Results and Discussion

The results of this assessment are shown in Figure 1. During baseline, Joe responded correctly to every easy problem and all but one medium problem presented. He responded "I do not know" to all but four difficult problems. Responses were always provided after substantial delays (latency *M*s = 35.9 s for easy, 81.0 s for difficult, and 85.3 s for medium problems). The first DR-short condition was therefore implemented with easy and difficult problems. Again, Joe provided correct responses for every easy problem and "I do not know" responses for every difficult problem. The mean response latency for these problems decreased to 2.1 s and 2.9 s for easy problems and difficult problems, respectively. Although the DR-short contingency was not applied to medium problems, the mean response latency for medium problems decreased to 2.7 s and Joe's responding switched from correct responses to "I do not know" (67% of problems) or incorrect responses (11% of problems). These data suggest that undesirable generalization of the DR-short condition may have occurred in the presence of medium problems. Therefore, the DR-correct condition was implemented. Correct responding increased from 22% to 93% of medium problems during the DR-correct condition. Response latencies for these problems increased as well, but remained below initial baseline levels ($M = 38.3$ s). We then conducted a contingency reversal by implementing the DR-short condition for medium problems (i.e., rapid responding to medium problems was explicitly reinforced). Rapid (latency $M = 2.9$ s) "I do not know" (75% of problems) responding then reemerged for medium problems. Following a return to the DR-correct condition, a correct response was emitted for each medium problem. Rapid responding was maintained for the easy and difficult problems across these contingency changes for the medium problems.

These results extended those of Study 1 in three ways. First, we determined that the effects of the DR-short contingency resulted in generalization across math problems (i.e., when novel problems were presented, they were responded to rapidly). Second, we determined that the effects of the DR-short contingency resulted in undesirable generalization to medium problems (i.e., Joe began to answer "I do not know" quickly rather than work out long-division problems). Third, we demonstrated the effectiveness of a discrimination-training procedure that involved rules and both DR-short and DR-correct contingencies for generating optimal performances.

The results of the current study are limited in at least two ways. First, these interventions were evaluated with only 1 participant and with a limited number of tasks. The generality of these findings to other individuals with excessively slow responding should be the focus of future investigations. Second, we did not attempt to determine the function of excessively slow responding; future researchers may wish to address this limitation. Finally, future research should compare the effectiveness of DR-short contingencies with other response-shaping procedures (e.g., percentile schedules; Galbicka, 1994).

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